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Environmental impacts of cryptocurrency mining

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Introduced in 2009, the current concept of crypto-currency is defined as electronic money - value units established between pairs according to specific rules, regardless of the interference and validation from central banks. Today, while the adoption of several digital currencies is constantly growing, questions about the environmental impacts of its mining are on the rise.

Mining is the process by which the crypto-coin transactions are checked and validated by means of intensive mathematical computation for the network.

As a reward for these services, miners receive the newly created coins - as well as the fees associated with the transactions they confirm. Therefore, the miners compete with each other and their revenue is proportional to the computing power they have. It is estimated that the energy consumption used by the Bitcoin network is similar to Denmark's.

The main criticisms are focused on excessive energy consumption and its negative consequences to the environment. However, such criticisms should be evaluated in a broader perspective, seeking to understand possible social developments of the new technologies of value and energy production.

Arguments for the expansion of mining activities are linked to the increase in the processing capacities of computers. Under Moore's law, there should be an improvement in performance over time, which tends to bring down the cost, dimensions, and power consumption of processors. In such scenario, greater efficiency of the mining process should be just a matter of time. However, it is possible to infer that, through the very way that mining is structured, increasing hardware performance would lead to the development of ever more powerful algorithms - which in turn would require more

and more processing. The most interesting argument for the expansion of mining activities, eventually, is the stimulus to the use of renewable energies. We shall return to this later.

In countries like Venezuela or Russia - which concentrate large mining operations - energy is subsidized and also of fossil origin. Such operations are environmentally unsustainable. There is still no benefit that justifies the massive adoption of these types of currency.

However, according to the report "The Cloud Begins With Coal - Big Data, Big Networks, Big Infrastructure, and Big Power, 2013," fossil fuels in the digital economy is not exclusive to crypto-coins. On the contrary, it is dominant within the 7% of the global energy consumed by the digital

industry. In the US, most data centers are still powered by coal. Also, the recently published Greenpeace study "Clicking Clean: Who Is Winning The Race To Build The Green Internet" states that, except for the main players, the adhesion to renewable energies is low. How much a company or a service contributes to the depletion of natural resources and environmental degradation challenges the expansion of the digital infrastructure.

This is where crypto-mining may have an impact, as it is known that the profitability of these activities is directly linked to the use of cheap and abundant energy. Consequently, one could expect long-term socio-environmental gains, stemming from

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a new and powerful stimulus to the use of clean energy: the creation of economic value. Also, one can speculate that the emergence of crypto-coins is an instrument that drives the very expansion of the digital infrastructure network by allocating hardware to specific addresses in the globe, conditioning the creation of economic value to a clean energy-based infrastructure.

But from threat to promise there is a long way. At Plattsburgh, New York, a moratorium on crypto-mining activities was enacted. Located on the banks of the St. Lawrence Dam, the city runs on a subsidized energy quota. With the arrival of the crypto-miners, this quota was extrapolated and the value per MW consumed rose. The residents mobilized and the matter ended in the Chamber. Although miners claim that the city is "settling against innovation," the benefits of harboring mining companies are not clear. The issue is not mainly the increase in the energy bill: Because miners do not have fiscal address there, the intensive use of the prime local resource - cheap, clean energy - does not bring tax money or meaningful jobs to the county.

In this context, the clean energy available in locations such as Iceland, is an attractive for this emerging sector. The island is allowing an intense influx of miners in its territory, seeking for its profuse geothermal energy. However, the Icelandic society is questioning whether there are any social gains in such activity. According to Rep. Smari McCarthy, "we are spending hundreds of megawatts on producing something that has no tangible existence and no real utility for humans outside the realm of financial speculation." For him, it is necessary to consider the regulation and taxation of the emerging industry.

This was basically what Kazuno, a city of 32,000 people in northern Japan, did. Served with clean energy and with an average annual low temperature, the local authorities regulated the activities of cryptocurrencies mining to encourage the coming of companies and qualified professionals create the first clean energy-based mining center in Japan.

A broader geographical view led the Swiss startup Envion to adopt a different strategy: it has planned an end-to-end mobile mining operation. Its products are containers filled with processors and cooling equipment (the cost of cooling can reach 50% of the value of the energy spent in a mining center) that can be shipped to any place in the world where excess clean energy is being sold at near zero cost. This happens close to energy sources.

The future course of this activity depends on the interaction of environmental, societal, political and technical factors. However, what seems to be clear is that promoting crypto-coins as a virtual currency destituted from a "physical" ballast is misleading. Its value is based on the technological infrastructure of society - in the

technical configuration of nature itself. Although it is undeniable that the mining activity is potentially predatory, this scenario must be compared with the environmental impact of other value mining / production technologies, such as gold mining and the very structure of the networks of banks, mints, security and other elements.

This is an open debate, where there seem to be two opposed scenarios: one where the acceleration of value production catalyzes a global exhaustion of energetic matrices, and another where this same acceleration results in achieving energy sustainability goals. In any case, it is necessary to be skeptical about any statement that advocates and/or promotes crypto-mining, without taking into account the time of transition to a model that is fully fueled by clean energy, or that simply marginalizes a cultural phenomenon from which a new social and economic order can emerge.



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This article is a result of the author's ascertainment and analysis, without compulsorily reflecting CEST's opinion.